EXHIBIT 1
DATE 1/23/2013
HB

Estimated Potential Economic Impact of Invasive Mussel Introduction to Montana

DRAFT – Prepared by C. Duncan, 2/2011

Congressional researchers estimated that an infestation of zebra mussel in the Great Lakes cost the power industry alone $3.1 billion in the 1993-1999 period, with a total economic impact on industries, businesses, and communities of more than $5 billion. Given the well-documented impacts these species have had in the Great Lakes, many western states are on high alert to contain, control and prevent the spread of these mussels in the West. Nevada, California, Arizona, Colorado and Utah each have detected these species in critical water supply systems, and have launched aggressive eradication and control programs in an attempt to minimize impacts. The state of Idaho recently calculated a potential economic impact of $94.4 million if invasive mussels were introduced to that state.

Zebra and quagga mussels have **not** been confirmed in Montana waters to date. In order to understand the potential impacts of these species to Montana, staff examined existing databases and published research to generate estimates on comparable occurrences in Montana. The results reflect an estimated cost due to direct and indirect impacts on infrastructure and facilities that use surface water. Most of the published data investigated does not report annual costs, however annual maintenance costs would be expected to increase for all of the categories examined. In some cases, economic impacts could not be estimated. For example, no comparable economic data exists for mussel impacts on irrigation systems, therefore they are excluded from the potential cost estimates. The estimates are considered conservative and for the most part are reported in 1997 dollars, not adjusted for inflation.

The following categories were examined:

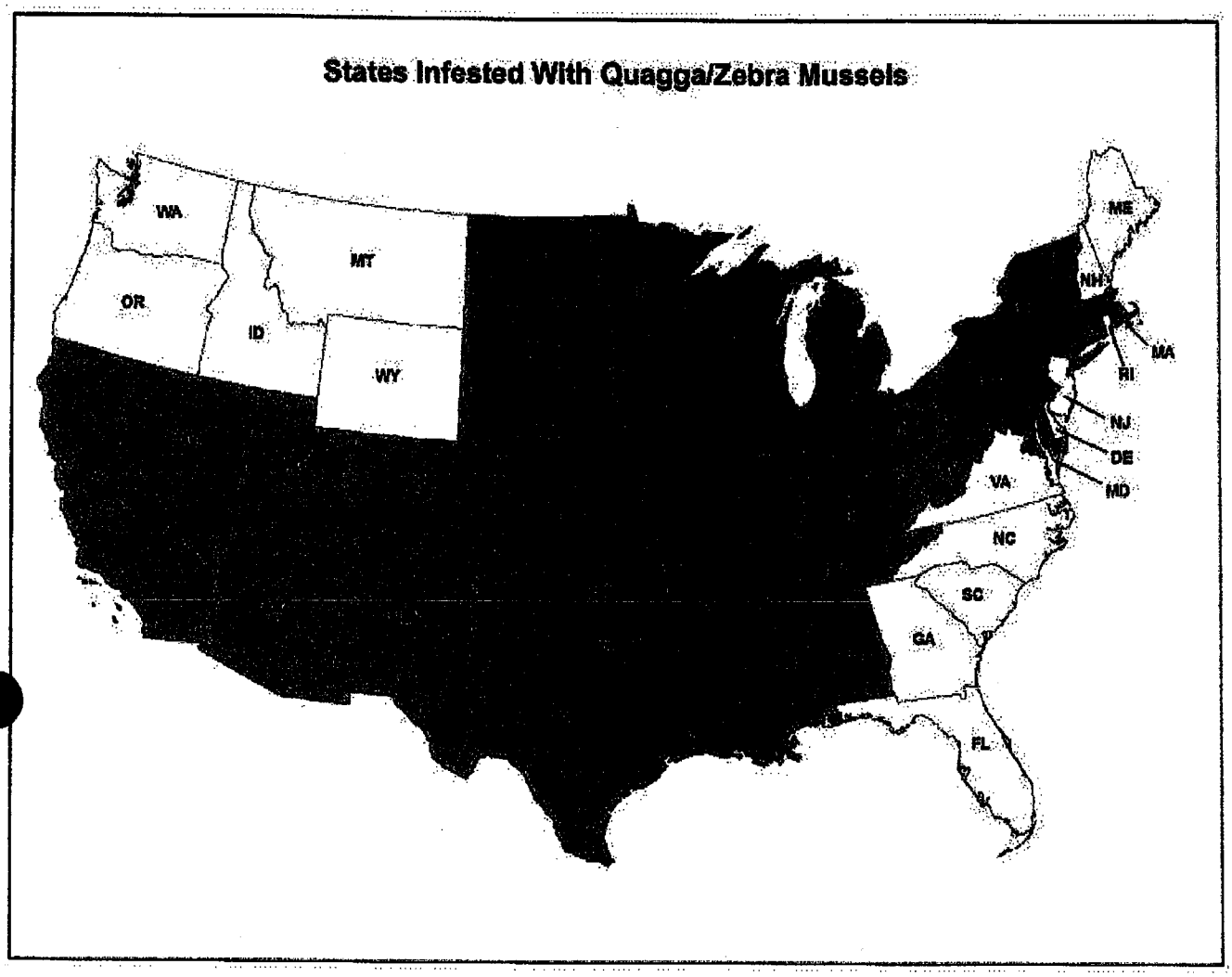
- Hydro Power: These estimates were based on a Bonneville Power Administration-commissioned study that examined the estimated hydropower maintenance costs associated with zebra mussel by examining the Bonneville Dam First Powerhouse, costs associated with Asian clam control at Bonneville, and a survey of zebra mussel mitigation costs at other hydropower generation facilities in North America. The study estimated the costs for installing sodium hypochlorite systems and applying antifouling paint to 13 federal hydroelectric projects in the Columbia River Basin.
    - The Montana estimate was based on the BPA average cost per project ($1.817 million) for the 23 hydropower dams in Montana for a total of $41.791 million (Phillips et al. 2005).
- Other Dams: Other dams include water impoundment structures not associated with power generation. These structures will incur maintenance costs associated with mussel fouling of pipes and structures.
    - Estimate based on figures from O'Neil (1997) for navigational lock structures ($1,730 per structure) applied to 190 structures in the state for a total of $328,700.
- Drinking Water Intakes: The drinking water facilities included in this analysis are facilities that draw surface water for municipal or public drinking water use. Mussels foul intake piping and water processing infrastructure, increasing maintenance costs and degrading water flavor due to mussel waste and decomposition in water lines. Private single family home water intakes for drinking and irrigation are not included in this estimate.
    - Estimates based on O'Neill (1997) figures from water treatment facilities ($42,870 per facility) applied to 100 facilities in Montana for a total of $4.287 million.
- Boating Facilities: Boating facilities include marinas, docks and boat launches. Increased cost estimates are based on maintenance associated with dock and boat launch fouling.
    - Estimates based on O'Neill (1997) figures from marinas ($750 per facility) applied to 320 Montana facilities (only includes FWP facilities not those by BOR, USACE, private or agencies) for total of $240,000

- Fish Hatcheries and Aquaculture: Hatcheries and aquaculture facilities are vulnerable to zebra / quagga mussel fouling. Pipes, pumps and raceway structures are all subject to increased operations and maintenance costs.
    - Estimates based on O'Neill (1997) figures for hatcheries and aquaculture impacts ($5,860 per facility) applied to 10 state, 12 private, and 3 federal facilities in Montana = $146,500
- Boater Costs: More than 50,000 motorized boats were registered in the state of Montana (Ryce 2011). Potential increases in boater costs are based on estimates for anti-fouling paints and increased per-boat maintenance costs.
    - Estimates based on Vilaplana et al. (1994) for increases in boater maintenance costs ($265 per boat) = $13,250,000
- Fishing Use: Research on impacts of mussels on fisheries is limited but reductions of fish numbers are likely. Vilaplana et al. (1994) found a 4% decrease in boater recreation because of mussel introduction.
    - Estimate based on a 4% reduction of use applied to 3,359,526 angler days in 2009 license year averaging $150 per day (based on Idaho data) = $20,157,156.00
- Irrigation: 12,000 points of diversion (POD) were identified in Montana by the Montana Department of Water Resources. Multiple points of use (POU) may be associated with each POD. Each POD and POU could be affected by the introduction of zebra or quagga mussels. These mussels can grow up to 0.5mm / day under ideal conditions and could impact water conveyances that are seasonally dry. Fouling from mussel establishment is cumulative and increased fouling and flow reduction would occur in ditches, pipes, pumps, fish screens and diversion structures over time. Published research on mussel related flow reduction in irrigation systems is minimal, but mussel establishment in pipes and pumps is well documented. The true impacts of zebra and quagga mussel introduction on irrigated agriculture in Montana are uncertain, but there is a high probability that invasive mussels will increase maintenance costs for operations that rely on surface water for irrigation.

Table 1: Total estimated impact of mussels in Montana.

Facility	Number	Estimated Cost Per Unit	Estimated Cost State-Wide	Citation
Hydro Power	23	$1,817,000.00	$41,791,000.00	Phillips et al. 2005
Other Dams	190	$1,730.00	$328,700.00	O'Neil 1997
Drinking Water	100	$42,870.00	$4,287,000.00	O'Neil 1997
Boat Facilities	320	$750.00	$285,000.00	O'Neil 1997
Hatcheries/Aquaculture	25	$5,860.00	$146,500.00	O'Neil 1997
Boat Maintenance	50,000	$265.00	$13,250,000.00	Vilaplana andHushak 1994
Angler Days (4% reduction)	3,359,526	$150.00	$20,157,156.00	Vilaplana andHushak 1994
Irrigation POD	12,000			Little current published data
Total Estimated Impact in MT			**$80,245,356.00**	

Figure 1: United States map showing five states in the PNW mussel free. Highlights the critical need for five-state collaboration on AIS prevention efforts.



References:

Idaho Aquatic Nusiance Species Task Force 2009. Estimated Potential Economic Impact of Zebra and Quagga Mussel Introduction into Idaho

O'Neill, C. 1997. "Economic impact of Zebra Mussels: Results of the 1995 Zebra Mussel Information Clearinghouse Study." Great Lakes Res. Review, Vol. 3, No. 1: 35-42

Phillips, S., T. Darland and M. Systma. 2005. Potential Economic Impacts of Zebra Mussels on the Hydropower Facilities in the Columbia River Basin. Pacific States Marine Fisheries.

Vilaplana, J.V. and L.J. Hushak. 1994. "Recreation and the Zebra Mussel in Lake Erie, Ohio." Technical Summary. OHSU-TS-023. Ohio Sea Grant College Program. Columbus, OH. S

Resource Indemnity Funding

Related Funds	02010 Oil & Gas	02022 Future Fish	02070 HazWas	02107 ECA	02162 EQPF	02216 Wa Sto	02289 GRW	02472 Orphan Share	02576 Operations	2577 Projects
Beginning FY2013 Fund Balance	$389,398	$1,265,466	$569,528	$697,712	$5,386,454	$950,000	$0	$10,040,797	$1,775,947	$6,795,909
RIT Interest		$500,000	$93,860		$32,490		$300,000		$234,650	$3,500,000
STIP	$1,000		1,726		10,000	$1,500				
RIGWA			386,961		386,961		366,000		386,961	773,922
Metal Mines Tax									1,339,000	
Oil and Gas Tax	50,000							$3,204,839	2,194,500	2,346,594
Other Income	0				792,311	35,000			3,500	3,525
FY 2013 Total Revenues & Fund Balance	$440,398	$1,765,466	$1,052,075	$697,712	$6,608,216	$986,500	$666,000	$13,245,636	$5,934,558	$13,419,950
FY 2013 Appropriations	($166,216)		($621,637)	($25,000)	($4,099,429)	($250,768)	($666,000)	($4,119,422)	($3,995,487)	
FY 2013 Budget Amendment										
Transfers								(1,200,000)	(11,756)	
Reserved for Capital Appropriations										
HB 6 and HB 7 Appropriation		($1,765,366)						($5,825,311)	($623,000)	(12,191,663)
Project Line Item Veto Richland County HB 7										$293,000
Projected Fund Balance Ending FY 2013	$274,182	$100	$430,438	$672,712	$2,508,787	$735,732	$0	$2,100,903	$1,304,315	$1,521,287
Revenues for 2015 Biennium										
RIT Interest - Direct		$985,521	$94,120		$32,580	$485,521	$591,313		$235,300	$6,898,646
RIGWA			959,172		959,172		732,000			1,918,344
Anticipated reversions										
Short Term Investment Pool - Interest	$2,000		$3,473		20,000	3,000		$45,000		
Admin Fees					1,553,586					
Metal Mines Tax									2,534,000	
Oil and Gas Tax	$100,000							$6,385,568	$4,372,491	4,675,534
Agency Generated Revenues					7,530,000	$70,000				$31,000
Transfers - Other										
Other Income					$1,036					
Projected Fund Balance Beginning FY 2014	$376,182	$985,621	$1,487,203	$672,712	$12,604,125	$1,294,253	$1,323,313	$8,531,471	$8,446,106	$15,044,811
Appropriations for 2015 Biennium										
UM-Bureau of Mines							($1,332,000)		($351,772)	
DNRC - Centralized Services									(76,404)	
DNRC - Conservation and Resource Devel. Division									(1,362,355)	
DNRC-Water Resources Division									(415,867)	
DNRC - Board of Oil & Gas	($200,000)									
DNRC - Forestry/Trust Lands									(187,314)	
DEQ-Central Management									(266,492)	
DEQ-Planning, Prevention & Assistance			($155,504)						0	
DEQ-Enforcement			(1,406)						(12,544)	
DEQ-Remediation			(161,594)		($7,596,939)			($872,529)	0	
DEQ-Permitting & Compliance			(480,562)						(3,796,414)	
Judiciary-Water Court									(2,062,727)	
HB 6 and HB 7 Request										(14,967,628)
Non-Budgeted Transfers								(2,400,000)		
Total Appropriations	($200,000)	$0	($799,066)	$0	($7,596,939)	$0	($1,332,000)	($3,272,529)	($8,531,889)	($14,967,628)
Adjustments for Agency 5% plans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Ending Fund Balance	$176,182	$985,621	$688,137	$672,712	$5,007,186	$1,294,253	($8,687)	$5,258,942	($85,783)	$77,183

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Department of Natural Resources and Conservation Coal Tax Shared State Special Revenue				
	FY 2012	FY 2013	FY 2014	FY 2015
Beginning Balance	$1,772,339	$1,548,604	$0	$0
Expenditures				
Montana State Library	509,800	509,800	562,801	562,801
Natural Resources & Conservation	2,207,390	2,204,821	2,209,998	2,209,765
Agriculture	386,322	374,901	434,565	435,014
Total Expenditures	$3,103,512	$3,089,522	$3,207,364	$3,207,580
Revenues	$2,879,777	$2,997,000	$3,165,000	$3,293,000
Ending Fund Balance*	$1,548,604	$1,456,082	($42,364)	$85,420
*The ending fund balance will be transferred to the general fund at the end of FY 2013.				

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MONTANA WHEAT & BARLEY COMMITTEE FY 2013 BUDGET

RESEARCH		**35%**	**1,119,848**
MONTANA STATE UNIVERSITY			
WHEAT STEM SAWFLY IPM-DEVELOPING NEW FORMS OF HOST PLANT RESISTANCE	WEAVER		$210,000
EVAL. OF MATERIALS/PRACTICES CONTRIBUTING TO ECON. CROP PRODUCTION IN MT	MAES		$180,000
SPRING WHEAT BREEDING AND GENETICS	TALBERT		$110,000
WINTER WHEAT BREEDING AND GENETICS	BRUCKNER		$110,000
IDENTIFYING AND DEVELOPING IMPROVED BARLEY VARIETIES FOR MONTANA	BLAKE		$60,000
MINING FOR MARKERS TO BE USED FOR MARKER-ASSISTED BREEDING	SHERMAN		$46,600
PREBREEDING FOR ROOT HEALTH IN MONTANA'S WINTER WHEAT	DYER		$40,500
IMPROVED QUALITY OF MONTANA HARD RED AND HARD WHITE WHEATS	NASH		$40,000
PARASITOIDS OF THE WHEAT STEM SAWFLY: AUGMENTATION, IMPACT & EDUCATION	WEAVER		$39,000
SELECTION OF HARD SPRING AND WINTER WHEAT WITH NO PPO ACTIVITY	GIROUX		$33,325
SENSOR-BASED NITROGEN FERTILIZATION ALGORITHM FOR WINTER WHEAT VARIETIES	WALSH		$28,500
MANAGING WIREWORM DAMAGE TO WHEAT & BARLEY-A GROWING PROBLEM IN MT	WANNER		$27,000
FOLIAR FUNGICIDE IN DRYLAND WINTER WHEAT	BURROWS		$25,439
ORANGE WHEAT BLOSSOM MIDGE MANAGEMENT	STOUGAARD		$20,600
MOLECULAR MARKERS FOR BREEDING RESISTANCE W/NEW RUST RESISTANT GENES	HUANG		$19,500
IMPROVING DOUGH STRENGTH & EXTENSIBILITY/NEW GLUTENIN MUTATIONS	MARTIN		$17,380
WEED SEEDLING ID GUIDE FOR MONTANA & THE NORTHERN GREAT PLAINS	MENALLED		$16,289
DIVERSIFIED CROPPING SYSTEMS: HIGH & LOW INPUT STRATEGIES	MILLER		$15,000
EARLY GENERATION DURUM SELECTION AND GERMPLASM IMPROVEMENT	ECKHOFF		$12,500
INTENSIFIED DRYLAND CROPPING SYSTEMS FOR SOUTHERN MONTANA	MCVAY		$12,000
ATMOSPHERIC TRANSPORT, WATER USE, & CARBON SEQ. IN MT WHEAT FIELDS	STOY		$7,400
AG APPRECIATION WEEKEND AND PROPOSAL BOOK PRINTING EXPENSES	JACOBSEN		$5,000
REPRINT OF WHEAT DISEASES ID BOOKLET	BURROWS		$4,100
"MONTANA AG LIVE" UNDERWRITING	RIESSELMAN		$3,500
ROLE OF FUNGICIDE AND WINTER WHEAT VARIETY IN LOW FALLING NUMBERS	BURROWS		$2,640
EVAL. OF BARLEY, SPRING & WINTER WHEAT FOR POST HARVEST SEED DORMANCY	WICHMAN		$2,260
USDA AGRICULTURAL RESEARCH SERVICE			
CHARACTERIZATION OF SPOT FORM NET BLOTCH ON BARLEY IN EASTERN MONTANA	FRIESEN		$31,315
MARKET DEVELOPMENT		**32%**	**1,046,000**
U.S. WHEAT ASSOCIATES			
BOARD MEMBER ASSESSMENT			492,800
SPECIAL PROJECTS, TECHNICAL MEETINGS, TRADE TEAM ACTIVITIES & OVA/EPC SURVEYS			55,110
U.S. GRAINS COUNCIL			
BOARD MEMBER ASSESSMENT			80,000
SPECIAL PROJECTS, OFFICER TRAVEL AND TRADE TEAM ACTIVITIES			55,000
WHEAT FOODS COUNCIL			
BOARD MEMBER ASSESSMENT			70,214
NORTHERN CROPS INSTITUTE			
GENERAL OPERATING SUPPORT			45,000
FOOD BARLEY MARKET DEVELOPMENT AND PROMOTION SUPPORT			25,000
NATIONAL BARLEY FOODS COUNCIL			
BARLEY FOODS PROMOTION			5,000
NORTH DAKOTA STATE UNIVERSITY			
2012 HARD RED SPRING AND DURUM QUALITY SURVEY & COLLECTION EXPENSES			16,500
2012 MONTANA BARLEY CROP QUALITY SURVEY AND REPORT			10,745
INSTITUTE OF BARLEY AND MALT SCIENCES SUPPORT			10,000
WHEAT MARKETING CENTER			
IMPROVING THE COMPETITIVE EDGE OF MONTANA WHEAT/GENERAL SUPPORT			47,900
MONTANA WHEAT EXPORT TOUR & WHEAT QUALITY WORKSHOPS			15,000
CONNECTING WHEAT PROFESSIONALS			10,000
MONTANA DEPARTMENT OF AGRICULTURE - STATE GRAIN LAB			
REPLACE 2 CARTER DOCKAGE MACHINES W/PANS & 2 MOISTURE MACHINES			40,000
PLAINS GRAINS INC			
2012 HRW WHEAT QUALITY SURVEY			10,231
PERSONAL CONTRACT/BARLEY CONSULTANT-EXPERT			
DAVE TWEET/TWEET CONSULTING, LLC			24,000
WHEAT QUALITY COUNCIL			
WHEAT QUALITY ENHANCEMENT AND COMPARISON			4,000
NATIONAL PASTA ASSOCIATION			
BOARD MEMBER ASSESSMENT			3,000
MONTANA WHEAT EXPORT TOUR & MARKETING WORKSHOP			
TOUR NCI, DULUTH AND MINNEAPOLIS			16,500
WBC UNANTICIPATED SPECIAL PROJECT FUNDING			10,000
EDUCATION AND INFORMATION		**8%**	**265,860**
NATIONAL BARLEY GROWERS ASSOCIATION			
ENHANCING THE PROFITABILITY OF THE BARLEY INDUSTRY			20,000
MONTANA WHEAT & BARLEY COMMITTEE			
MWBC MARKET NEWS SERVICE			3,000

EDUCATION AND INFORMATION, continued		
NATIONAL ASSOCIATION OF WHEAT GROWERS		
WHEAT INNOVATION		30,250
ENERGY, ENVIRONMENT & CONSERVATION ACTIVITIES		30,250
PUBLIC PROMOTION & COLLABORATION		30,250
WHEAT INDUSTRY BIOTECH COUNCIL SUPPORT		5,000
NATIONAL WHEAT IMPROVEMENT COMMITTEE SUPPORT		5,000
MONTANA GRAIN GROWER ASSOCIATION		
GROWER EDUCATION		13,000
YOUNG GRAIN GROWERS EXPORT TOUR TO PORTLAND		7,000
AGRICULTURE IN MONTANA SCHOOLS		
SHOW ME AND TEACH ME ALL ABOUT MONTANA AGRICULTURE		6,000
MONTANA AGRICULTURAL STATISTICS SERVICE		
WHEAT AND BARLEY VARIETIES		25,000
BARLEY SOLD FOR MALT		5,000
MONTANA WHEAT UTILIZATION		3,000
MONTANA AG STATISTICS BULLETIN		2,000
KATQ NE MONTANA FARM EXPO		
FARM AND RANCH APPRECIATION BREAKFAST		700
"TRADER'S DISPATCH" NEWSPAPER		
SEMI-MONTHLY MWBC NEWS		4,500
U.S. WHEAT ASSOCIATES ANNUAL REPORT INSERTION		2,000
WOMEN INVOLVED IN FARM ECONOMICS		
MONTANA PROMOTIONAL ACTIVITIES		5,000
MONTANA FUTURE FARMERS OF AMERICA FOUNDATION		
GENERAL SUPPORT		8,000
MONTANA 4-H FOUNDATION		
SMALL GRAINS PRODUCTION SCHOLARSHIPS		1,500
CASCADE COUNTY EXTENSION SERVICE		
2012 WHEAT-AND-BARLEY-A-THON BAKING CONTEST		900
MONTANA DEPARTMENT OF AGRICULTURE		
YOUNG AG COUPLES CONFERENCE		4,150
AGRICULTURAL LITERACY SPECIALIST		10,000
CENTRAL MONTANA FAIR		
MILLING AND BAKING COMPETITION		1,760
DEER LODGE VALLEY CONSERVATION DISTRICT		
MONTANA RANGE DAYS COMMITTEE		600
GALLATIN VALLEY AGRICULTURE COMMITTEE		
"2013 FARM FAIR"		3,000
MONTANA FARM BUREAU FEDERATION		
GROWER EDUCATION		12,150
MONTANA FARMER CAMPAIGN		850
GLASGOW AREA CHAMBER OF COMMERCE AND AGRICULTURE		
NEW TRENDS IN AGRICULTURE SEMINAR		3,000
MONTANA FARMERS UNION		
GROWER EDUCATION		13,000
WBC UNANTICIPATED SPECIAL PROJECT FUNDING		10,000
TRANSPORTATION	**5%**	**150,250**
EXPERT RAIL REPRESENTATION		
EXPERT CONTRACT		90,000
ARC BOARD MEMBER ASSESSMENT		10,000
NATIONAL ASSOCIATION OF WHEAT GROWERS		
COMPETITIVE TRANSPORTATION		30,250
MONTANA AGRICULTURAL STATISTICS SERVICE		
GRAIN MOVEMENT REPORT		20,000
OPERATIONS	**20%**	**659,289**
TOTAL FY 2013 BUDGET		**$3,241,247**

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